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BOOK REVIEWS

Graph theory with applications, by J.A. Bondy and U.S.R. Murty, American Elsevier Publishing Company, Inc., New York, New York, x + 164 pp., $19.50.

When I first entered the world of Mathematics, I became aware of a strange and little-regarded sect of "Graph Theorists", inhabiting a shadowy borderland known to the rest of the community as the "slums of Topology". What changes there have been in a few short years! That shadowy borderland has become a thriving metropolis. International conferences on Graph Theory occur with almost embarrassing frequency. Journals on Graph Theory abound: I once counted the Editorial Offices of three of them in one of the mathematical departments of one of the Universities of one of the smaller cities of Canada. Any connection with Topology is likely to be firmly repudiated as soon as noted.

I became aware of the burgeoning of Graph Theory when I studied the 1940 paper of Brooks, Smith, Stone and Tutte in the Duke Mathematical Journal, ostensibly on squared rectangles. They wrote of trees and Kirchhoff's Laws, of 3-connection and planarity, of duality and symmetry, of determinantal identities and coprime integers, – all in the Quest of the Perfect Square.

I invariably recommend that paper to my students. "Go to it", I say, "you will

> 'Find tongues in trees, books in the running Brooks,
> Sermons in Stones, and good in every thing' ". [8].

Sometimes they complain that the paper is difficult, being written in the terse and condensed style befitting an era of paper shortage. But from now on I shall have a reply to this. I shall refer them to the book of Bondy and Murty, saying that it makes an excellent introduction to the Brooks paper, and to many other manifestations of Graph Theory. Bondy and Murty may be a little short on determinantal identities, – not that that worries me, – but they do conclude with a marvelous Perfect Square.

Graph Theory began with a tour of Königsberg and the problem of Eulerian paths [4]. This part of the discipline was supplemented a century later with a discussion of the superficially analogous Hamiltonian paths. There is a chapter on all this in Bondy and Murty, so up-to-date as to include what I believe to be the first published account of the Horton graph. This is the first example of a non-Hamiltonian 3-connected biparite graph. I wish I could conscientiously put less praise into this review; I have not forgiven the authors for misspelling my name.

A second source of Graph Theory is to be found in the work of Cayley on trees and of Kirchhoff on trees and electric currents. Kirchhoff really started something, both in Physics and Mathematics. For the latter discipline he introduced the subject of Algebraic Graph Theory.